IT IS CLAIMED:

1. An array of separated lipid bilayers, comprising

a substrate having a surface defining a plurality of distinct bilayer-compatible surface regions,

a plurality of discrete lipid bilayer expanses in associated surface regions, said expanses having inner and outer bilayer surfaces,

an aqueous film interposed between each bilayer-compatible surface region and the lower surface of the corresponding lipid bilayer expanse,

each of said expanses containing one or more lipids derivatized with an oligonucleotide having a patch-specific oligonucleotide sequence and extending from the outer surface of the associated expanse,

a bulk aqueous phase covering the lipid bilayer expanses, and

at least one biomolecule anchored to at least one of the lipid bilayer expanses through a complementary oligonucleotide sequence capable of specifically hybridizing with the patch-specific oligonucleotide sequence in that expanse, such that the biomolecule is anchored to that expanse.

2. The array of claim 1, wherein the array further includes one more discrete lipid bilayer patches associated with said expanses, where each such patch contains such a biomolecule anchored to the associated expanse through said hybridized oligonucleotides.

3. The array of claim 2, wherein the lipid bilayer patches on different associated expanses have different compositions.

4. The array of claim 3, wherein the different compositions of each lipid bilayer patch are encoded by the patch-specific oligonucleotide sequence in the expanse.

5. The array of claim 2, wherein one or more of the lipid bilayer patch is a vesicle.

6. The array of claim 2, further comprising one or more second biomolecules associated with the bilayer patches, said second biomolecule(s) being able to move substantially freely within the associated patch.

7. The array of claim 6, wherein at least some of the different bilayer patches have different second biomolecules.

8. The array of claim 1, wherein the biomolecule corresponds to the oligonucleotide sequence, such that the identity of the biomolecule may be determined from the sequence of the oligonucleotide.

9. The array of claim 1, wherein said discrete lipid bilayer expanses in associated surface regions are separated by one or more barrier regions.

10. The array of claim 1, wherein said discrete lipid bilayer expanses in associated surface regions are separated from one another by self-limiting lateral diffusion, without physical barriers between the expanses on the substrate surface.

11. The array of claim 1, wherein said distinct bilayer-compatible surface regions on the substrate are formed from a material selected from the group consisting of SiO_2, MgF_2, CaF_2, and mica.

12. The array of claim 1, wherein the lipid bilayer expanses are comprised of at least one lipid selected from the group consisting of phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, phosphatidic acid, phosphatidylinositol, phosphatidylglycerol, and sphingomyelin.

13. A method of using a lipid patch array to detect membrane-bound biomolecular interactions, comprising

incubating the array of claim 6 under conditions effective to allow for the formation of biomolecular complexes between the second biomolecules, and

detecting any formed biomolecule complexes.

14. The method of claim 13 for screening for molecules that enhance or disrupt membrane-bound biomolecular interactions, further comprising

contacting the array, prior to or after said incubating, with one or more molecules under conditions which allow for the interaction of said molecules with said biomolecules or biomolecular complexes,

detecting any formed biomolecular complexes, and

comparing the results from the previous step to the results from the detecting step of claim 13 to determine whether the one or more molecules enhanced or disrupted membrane-bound biomolecular interactions.

15. The method of claim 13, wherein the degree of complex formation is quantitated.

16. The method of claim 13, wherein said biomolecules are selected from the group consisting of peptides, proteins, carbohydrates, cytokines, growth factors, hormones, enzymes, toxins, drugs, oligonucleotides, lipids, and combinations thereof.

17. The method of claim 13, wherein said molecules are selected from the group consisting of peptides, proteins, carbohydrates, cytokines, growth factors, hormones, enzymes, toxins, drugs, oligonucleotides, lipids, and combinations thereof.

18. A method of manipulating lipid-bilayer regions on a substrate, comprising

applying, to the array of claim 1, a controlled laminar-flow stream of an aqueous liquid, under flow conditions effective to remove a portion of the expanse in the path of said stream, wherein remaining portions of said expanse are substantially retained in their original position(s) on said region, adjacent exposed portion(s) of said region.

19. A method of manipulating lipid-bilayer regions on a substrate, comprising

applying, to a substrate having formed thereon, a discrete, defined-shaped lipid expanse which is confined to a corresponding defined-shaped region on the substrate and separated by an aqueous film, a controlled laminar-flow stream of an aqueous liquid, under flow conditions effective to remove a portion of the expanse in the path of said stream, wherein remaining portions of said expanse are substantially retained in their original position(s) on said region, adjacent exposed portion(s) of said region.

20. A system for manipulating lipid-bilayer regions on a substrate, said system comprising

the substrate having formed thereon, a discrete, defined-shaped lipid expanse which is confined to a corresponding defined-shaped region on the substrate and separated by an aqueous film,

a flow generating device capable of applying a controlled laminar-flow stream to the substrate, and

a composition capable of selectively removing at least a portion of the expanse.